

Question 1 (12 marks)

A 60 year old woman presents with a few days history of pruritus. She has no other significant symptoms and her observations are within normal limits. She is afebrile.

Her blood results are:

		Reference range
Bilirubin	60	1-20 $\mu\text{mol/L}$
AST	38	4-45 IU/L
ALT	43	0-45 IU/L
ALP	248	30-120 IU/L
GGT	309	0-60 IU/L
Amylase	92	25-136 IU/L
Lipase	74	10-140 IU/L
Creatinine	280	60 – 110 $\mu\text{mol/L}$

a) What single pathological process will MOST LIKELY explain these blood results? (1 mark)

- Posthepatic obstruction. Will also accept the following as alternatives:
 - Biliary tract obstruction
 - Extrahepatic cholestasis/obstruction

b) Based on these results, list the three (3) MOST LIKELY aetiologies for these results in this patient. (3 marks)

- **Head of pancreas tumour**
 - **Common bile duct tumour (cholangiocarcinoma)**
 - Primary biliary cirrhosis/stenosis
 - Common bile duct stone (occasionally can present as painless jaundice)
 - Periapillary malignancy
 - Bile duct pathologies e.g. choledocolithiasis/stricture/primary sclerosing cholangitis/bilioma
 - Infection related cholangiopathy eg CMV HIV /parasitic (Ascaris)
 - Duodenal cyst/polyp/adenoma with CBD obstruction
- NB must say at least one of pancreas head tumour or common bile duct tumour to score full marks.

Examiner's note. First 2 options (in bold) are mandatory answers to get the full 3 marks.

c) You are considering further investigation via imaging. List two (2) advantages and two (2) disadvantages for each of ultrasound AND abdominal computed tomography (CT) SPECIFICALLY IN THIS PATIENT. (8 marks)

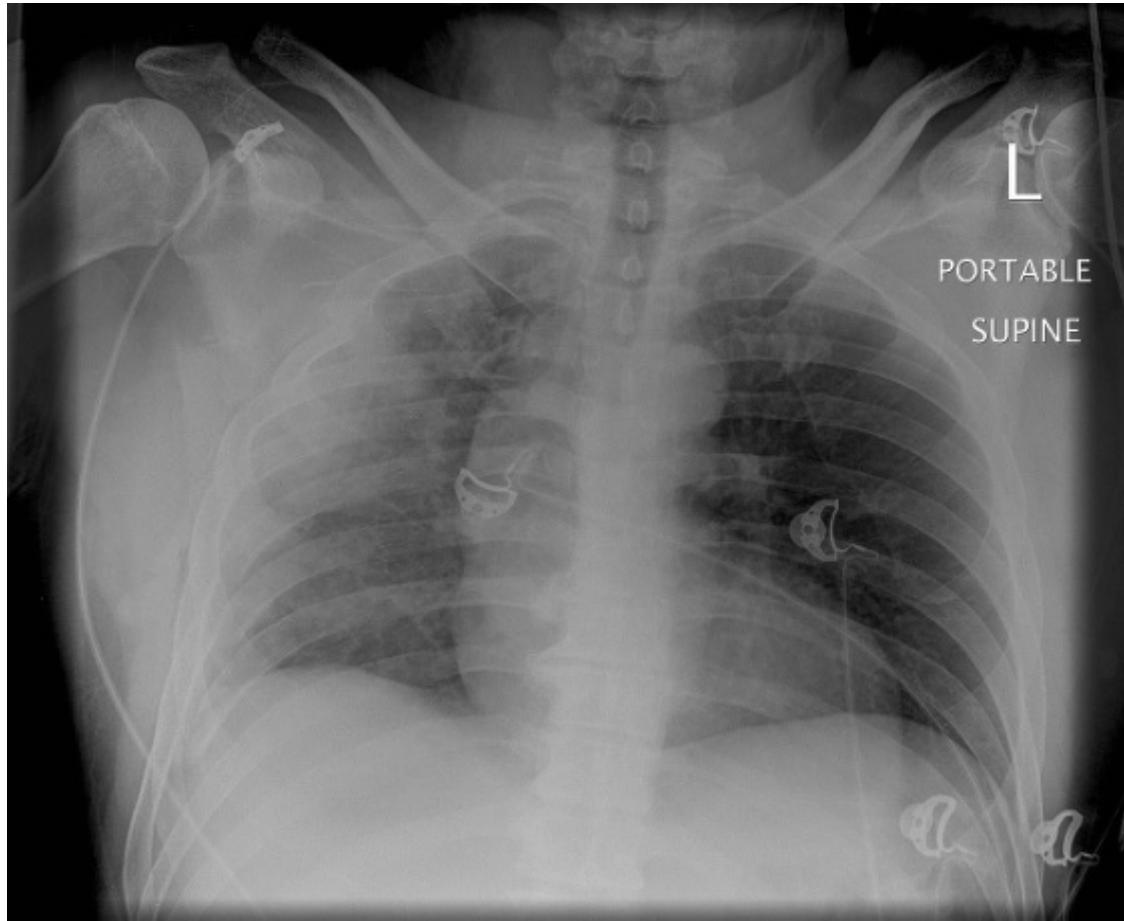
Ultrasound (4 marks)	
Advantages	Disadvantages
Good visualisation of biliary tree, including ductal pathology and tumours	Less accurate than CT for cause and site of obstruction
Can visualise pancreatic head tumours in most cases	Limited visualisation pancreatic tumours esp body or tail of pancreas
High sensitivity/specificity for stones in CBD and Gallbladder Or First choice for suspected choledocolithiasis	No/limited information about spread/staging of malignancies
Can diagnose some alternate pathologies (MUST give example to score a mark) Or Evaluate adjacent structures e.g. kidney/aorta	Artifact (if stated what)
Good sensitivity/specificity for Dx extrahepatic obstruction if CBD > 5mm diameter	Difficult to get images in obese patient
CT (4 marks)	
Advantages	Disadvantages
Investigation of choice for pancreatic tumours	Requires iv contrast / cannot be used in this patient as evidence of renal disease
Able to see metastatic disease to lymph nodes and other organs	Limited information regarding biliary tree
Able to stage disease with respect to tumour size and lymph nodes	Non conclusive bowel pathology
Can evaluate entire abdomen / alternative diagnoses e.g. choleangio Ca Periampullary Ca	Less sensitivity in people with low body fat
First choice investigation if suspect malignant cause of obstruction	Misses small stones Misses non calcified stones

NB generic disadvantage responses such as operator dependent, no radiation, limited availability, are considered non- consultant level, and not specific to this patient. They will therefore not score a mark.

Question 2 (12 marks)

A 26 year old man is brought in by ambulance complaining of severe right sided shoulder and chest pain following a rugby injury. He was tackled by an opposing player, and received a direct blow to the anterior upper chest wall.

A chest X-ray is taken and shown below.



a) State two (2) positive findings on his chest X-ray. (2 marks)

- Subcutaneous emphysema right
- Right lung diffuse opacifications which could represent pulmonary contusions or haemothorax
- Right sided rib fractures (3, 6, 7, 8)
- Right scapula fracture (displaced)

The patient has a CT which also shows a right posterior sternoclavicular joint dislocation.

- b) In the table list five (5) anatomical structures that maybe injured in a posterior sternoclavicular joint injury. For each injury, describe one (1) specific clinical feature that you would look for on physical examination. (10 marks)

Anatomical structure	Clinical feature
Trachea	1. Hoarseness 2. Neck subcutaneous emphysema 3. Stridor
Subclavian vascular injury	1. Ipsilateral upper limb ischaemia 2. Signs of haemothorax
Brachial plexus injury	1. Sensory deficit ipsilateral upper limb 2. Motor deficit ipsilateral upper limb
Lung / pleura	1. Reduced air entry 2. Hypoxia 3. Subcutaneous emphysema 4. Tracheal deviation
Oesophageal injury	1. Dysphagia 2. Odynophagia
Innominate/brachiocephalic vein injury or obstruction	1. Cyanosis / venous congestion of neck / arm 2. Signs of haemothorax
Common carotid/brachiocephalic trunk	Bruit / signs of stroke
Recurrent laryngeal nerve	Hoarseness / altered voice
Arch of aorta	1. Embolic phenomena 2. Upper limb BP discrepancy

Question 3 (18 marks)

A 52 year old woman presents to the emergency department complaining of the sudden onset of severe headache and vomiting, for which she has been taking paracetamol and codeine without benefit.

She has a past history of migraine diagnosed by her neurologist 5 years previously, depression, atrial fibrillation and poorly controlled hypertension.

Her regular medications include fluoxetine, rivaroxaban, enalapril and atenolol.

Her vital signs are:

RR	16 /min
SaO ₂	98% in room air
HR	85 bpm
BP	165/85 mmHg
Temp	36.5°C

a) List three (3) diagnoses you would consider in this patient, and for each diagnosis name two (2) features in the history which support this diagnosis. (9 marks)

- Subarachnoid haemorrhage. Sudden onset, hx of hypertension, presence of anticoagulants, maximal at onset, different from previous headaches, family history of SAH
- Spontaneous intracerebral haemorrhage. Poorly controlled hypertension, on oral anticoagulants, AVM
- Migraine headache. History of prior migraine, vomiting, preceding aura, unilateral, pulsating quality

b) You diagnose an acute migraine in this patient. Using the table below give three PARENTERAL drug options in three (3) separate drug classes for migraine treatment in this woman, with one advantage and one disadvantage for each. (9 marks)

Drug, dose & route (3 marks)	Advantage (3 marks)	Disadvantage (3 marks)
Metoclopramide ^a 10-20 mg IV	Could assist vomiting in addition to headache.	Unlikely to be efficacious as a single agent. Risk of dystonic reaction Drowsiness Akathisia
Sumatriptan (or other triptan in appropriate dose) 6 mg SC	does not require IV access	Possible serotonergic effects given fluoxetine Use contraindicated in uncontrolled hypertension as risk of cardiovascular adverse effects (ACS, CVA).
Chlorpromazine ^a 12.5-25 mg IV in 1 litre of saline over 1 hour	Could assist vomiting in addition to headache	Potential for significant hypotension given enalapril and atenolol medication Drowsiness Dystonia
Propofol 20mg IV titrated 5 minutely	Short duration of sedative action	Apnoea Hypotension Lack of familiarity Location: need to be monitored in resuscitation bay
Ketorolac 15-30 mg IV or IM	Allows use of NSAIDs in vomiting patient	Gastritis/exacerbate PUD Bronchospasm in asthmatic Renal impairment
Prochlorperazine ^a 5-12.5 mg IV	Antiemetic	Drowsiness Dystonic reactions Akathisia
Droperidol ^a 2.5mg IV slow or 2.5mg IM	Antiemetic	QT prolongation and/or torsades
Dexamethasone 10-25mg IV or IM	Antiemetic Can be used as an adjunct to reduce early headache recurrence	Mood altering Gastritis Immunosuppression Avascular bone necrosis Limited efficacy
Magnesium sulphate 2g over 30 minutes	Risk of hypermagnesaemia	Hypotension
Paracetamol 1g IV	Allows simple analgesia in vomiting patient	Unlikely to be beneficial as a single agent
Dihydroergotamine 0.5mg slowly IV	Effective as rescue therapy in resistant migraine	Risk of peripheral vasospasm

Note for examiners: OPIOIDS should be considered INCORRECT.

Also, the answer list contains several drugs from same class e.g. antidopaminergic but only one would be accepted for marks the other 2 answers had to be different classes

Question 4 (12 marks)

An 86 year old man has been brought to your emergency department after a fall at home. He had been lying on the floor overnight for 14 hours.

His vital signs are:

HR	132 bpm (Atrial fibrillation)
BP	95/55 mmHg
SaO ₂	93% on 15L of oxygen via Hudson Mask
Temp	33.2 °C (Tympanic)
GCS	13 (E3, V4, M6)

Your examination reveals widespread bruising consistent with a fall. His only medications are aspirin, metoprolol and perindopril.

His laboratory blood results are shown

Venous blood gas

		Reference range
pH	7.28	7.35 – 7.45
pCO ₂	45 mmHg	40-50
HCO ₃	11 mmol/L	24 – 32
BE	-6	-3 – 3
Na ⁺	141 mmol/L	135 – 145
K ⁺	7.9 mmol/L	3.5-5.1
Cl ⁻	109 mmol/L	95 – 110
Gluc	8.8 mmol/L	3.5 – 7.8
Lact	3.4 mmol/L	0.6 – 2.4
Hb	192 g/L	135 – 175

Further blood results

		Reference range
Creat	180 µmol/L	44 – 97
CK	18415 IU/L	<180
CRP	178 mg/L	<5

Regarding this patient's diagnoses:

a) What are the four (4) MOST IMPORTANT diagnoses to treat in this man? (4 marks)

- **Most important diagnosis: hyperkalaemia**
- **Most important diagnosis: rhabdomyolysis**
- Shock-Possible underlying respiratory sepsis/pneumonia (as consequence of long lie/aspiration).
- Shock-Possible underlying hypovolaemia/dehydration, causing renal impairment/failure
- Hypothermia
- Metabolic acidosis
- Possible head injury
- Rapid Atrial Fibrillation

NB Must say rhabdomyolysis and hyperkalaemia to get full marks for this subquestion

b) State four (4) reasons that support these diagnoses based on the blood tests. (4 marks)

- **CK 18415 = likely rhabdomyolysis**
- **Hyper K = 7.9 secondary to rhabdomyolysis and/or AKI**
- $AG = 141 - (11 + 109) = 21$ i.e. HAGMA
- Lactate 3.4 = dry/sepsis
- Hb 192 – polycythemia = dry/underling polycythaemia
- Creat 180 – raised = Early impending renal and pre-renal ARF vs old CRF (unlikely)
- CRP 178 – Inflammatory/infective response

NB Must say blood tests that relate to rhabdomyolysis and hyperkalaemia to get full marks for this subquestion

c) State two (2) benefits and two (2) adverse effects of giving NaHCO_3 in this case. (4 marks)

Benefits

- Transcellular shift of potassium from serum to cells (thus reducing the K^+)
- Alkalinisation of the urine to reduce tubular damage by myoglobin (reduces breakdown of myoglobin into toxic metabolites and crystallization of uric acid)

Adverse Effects

- Hypernatraemia (Increase in Na^+ load) – including volume
- Hypercapnia (Increase in HCO_3^- leading to formation of CO_2)
- Increase in intracellular acidosis
- Cerebral acidosis
- Shift or O_2 dissociation
- Curve to left/ $\downarrow$ O_2 delivery
- Hypocalcaemia